

## **On National Laboratory / University Collaborations**

Michael Holland  
Senior Policy Analyst  
Office of Science & Technology Policy

**July 10, 2003**

Dr. Marburger sends his regrets that he was unable to attend this workshop; I will deliver his prepared comments. As a former University President and Director of a National Laboratory, Dr. Marburger is particularly interested in the issues you will discuss in this workshop. Much has happened within DOE and the national labs since the Gavin Report<sup>1</sup> of the early 1990's. The end of the cold war produced much rethinking about the missions of the labs; major planning and change has occurred since then. Today the labs have largely sorted out their missions and long-range plans. Relations with universities are an element of most of these plans.

### **The Big Picture**

In the post cold war era, the DOE Office of Science national laboratories have become the major stewards of large-scale science capabilities essential for the most important areas of research today in a broad spectrum of scientific fields. These capabilities serve the entire U.S. science community. A significant fraction of the nation's expertise in areas such as neutron scattering, accelerator physics, or nuclear science resides within the national laboratories.

This stewardship entails unique capabilities for conceiving, designing, building, and operating the most complex technical apparatus ever constructed. This audience is intimately familiar with these accelerators, colliders, synchrotrons, neutron sources, and other scientific user facilities. The Department's stewardship role also requires the laboratories provide an effective interface with users of the facilities, including means to respond to user needs and to educate potential users regarding the capabilities of the facilities.

The stewardship function has grown rapidly together with rapid advances in technology, and is now the dominant role for the laboratories. Approximately 20 to 35 percent of the budgets of four of the multi-program labs — Argonne, Berkeley, Brookhaven, and Oak Ridge — was spent on facilities operations and construction in FY 2002. Stewardship of facilities is also a significant role for the Office of Science. The Office spends approximately 40 percent of program funds on facilities operations. In FY 2002, Biological and Environmental Research spent approximately 30 percent of its budget on facility operations; High Energy Physics spent close to 65 percent.

The rationale for continued federal investment in the labs is to make sure these capabilities, nearly all of them facilities based and strongly coupled to robust user support, remain available for U.S. science wherever it is centered — whether at universities, national labs, or in industry. It was precisely this logic that created support for the Nanoscale Science Research Centers, four of which will soon be under construction. Furthermore, the direction of the interaction is important to note. It is not the universities who can help the labs carry out their missions for DOE; it is the labs who are helping the universities carry out their research mission for all of the science

---

<sup>1</sup> <http://www.seab.energy.gov/sub/galvintsk.html>

agencies. The role of addressing DOE missions of environment, energy, and national security is not unique to the Office of Science laboratories. This work can often be performed by industrial or university laboratories.

### **Opportunities for National Laboratories in University Alliances**

Most obviously, universities offer labs the opportunity to create new user communities. Labs reach out to new disciplines through university departments with workshops, joint programs, etc. This interaction extends and strengthens the rationale for continued federal investment in the labs. There are a number of less direct benefits the labs can derive from closer alliances with the university community.

Cooperation and collaboration with universities is a means to increase political support for the labs. The universities need the labs' facility-centered capabilities if the universities themselves are to succeed in many of their research and education endeavors. The user communities are a natural starting point. Two pieces of data illustrate this. OMB received 209 letters supporting increased FY01 budget requests for the Office of Science – 75 percent were from university faculty or students from 26 different states. Of the 176 letters supporting increased FY04 budget requests for physical science including the Office of Science, 64 percent received by OSTP were from university faculty or students.

But, this opportunity to increase support requires labs to link strongly with university administration – not just science departments or research vice presidents. Universities have unique ties to community leaders, news media, and political leadership. Engineering and business schools usually have strong industry ties. Most have industry support groups. These divisions within the universities can help develop stronger linkages of the labs to industry. Robust interactions with universities are a vehicle through which the national labs can improve their public relations.

Finally, universities offer labs the opportunity to recruit outstanding employees. Universities offer the possibility of faculty joint appointments, access to top students and post-docs, and shared facilities. Universities may also enrich the cultural environment, whether through art exhibits, music recitals, lectures, student projects in lab spaces, museums, or shared access to libraries. These cultural links can be important in making the national labs attractive places to work.

### **Modes of University / National Laboratory Interaction**

University faculty or students using a national lab facility is the most common form of interaction. The majority of the more than 18,000 researchers who used beams of protons, electrons, photons, or neutrons, ran an experiment on a collider or accelerator, or ran code on a supercomputer at a DOE scientific user facility were academics, their postdocs or students. User organizations are typically dominated by university scientists. These user communities centered on lab facilities are particularly important. The national laboratories are serving the nation's scientific community as represented by these groups. Laboratories need to better inform university administration of user activity.

Collaborative research programs are the next most common form of interaction, but this mechanism not always systematically exploited. Universities need to develop faculty who can

take advantage of lab capabilities. Management contracts can be an important mode of interaction. Many national laboratories are operated by universities or university consortia. Examples include the University of California operating Los Alamos, Lawrence Livermore and Lawrence Berkeley; the University of Chicago operating Argonne, Universities Research Association operating Fermilab, or the Southeastern Universities Research Association operating Jefferson Lab.

Joint educational programs represent a crucially important interaction mode. Most laboratories have a strong historical commitment to regional university students, through a variety of summer programs, that is more stable than DOE funding for the educational function.

National laboratories also have the opportunity to build their relationships with regional universities through activities sponsored by the state in which they are located. Many regions have state-sponsored consortia for regional development that include universities and national laboratories. Other states sponsor technology incubators – both buildings and activities – that benefit from laboratory capabilities but are operated by universities.

### **Laboratory Actions**

There are things the national laboratories should do to strengthen their collaborations with universities:

- Make university interaction an explicit priority in laboratory planning and evaluation process.
- Broaden front of contact with universities – again not just science faculty.
- Include university personnel in laboratory planning and evaluation process. This occurs automatically for university contractors.
- Engage university personnel in recruitment – not only for technical personnel, but also for administrative, educational, and outreach positions.

In short, the long term survival of DOE laboratories depends upon their service to the technical community that delivers on DOE missions, no matter where that community is employed. University faculty and students comprise a significant fraction of that community.